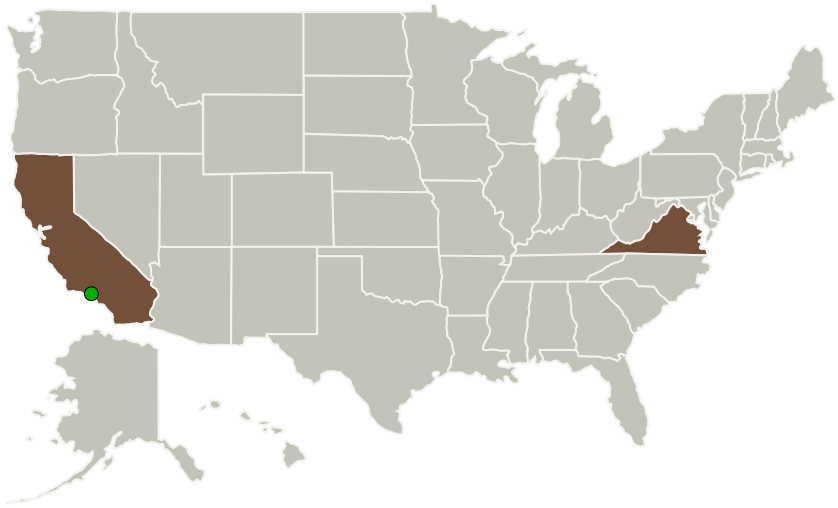
High Speed Lasercom Signal Processing and Ground Station, Phase I

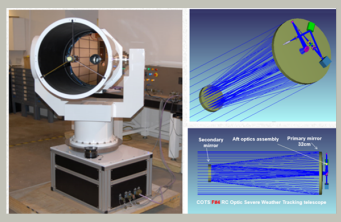
Completed Technology Project (2016 - 2016)

Project Introduction

Space laser communications offer the promise and opportunity to downlink greatly increased data volumes from space as a supplement to radio frequency (RF) systems. The objectives of this SBIR support NASA's deep space and near-earth optical communications needs by developing and making key technologies available to spacecraft/instrument developers and ground station operators that scale data volumes dramatically at a cost point that enables operational use for NASA missions. We propose to develop a modular optical ground station architecture that can scale to hundreds of Gbps data rates from lunar and near-earth orbits in a gradual, low-cost, readably scalable manner accommodating the Space Communications and Navigation (SCaN) network standards and in the future supporting multiple protocols. This SBIR will also develop a spaceflight high speed Serially Concatenated Pulse Position Modulation (SCPPM) data channel encoder for the spaceflight modem and the complementary decoder for ground station use. Current and future space technology demonstration programs have been successful in maturing laser optical technology and have primarily focused on the space segment of the link. Fibertek will develop an integrated spaceflight and ground station optical communication architecture that provides NASA and/or its potential commercial suppliers with the ability to support hundreds of Gbps downlink. space missions with laser and lidar instrument payloads.

Primary U.S. Work Locations and Key Partners





High Bandwidth Multi-channel Optical Ground Station

High Speed Lasercom Signal Processing and Ground Station, Phase I

Table of Contents

Small Business Innovation Research/Small Business Tech Transfer

High Speed Lasercom Signal Processing and Ground Station, Phase I

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Organizations Performing Work	Role	Type	Location
Fibertek, Inc.	Lead Organization	Industry	Herndon, Virginia
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Virginia

Project Transitions

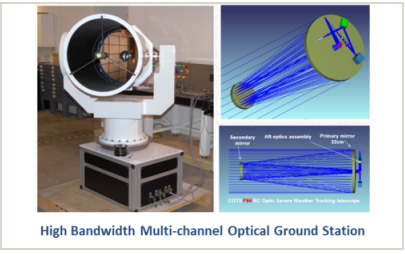
June 2016: Project Start

December 2016: Closed out

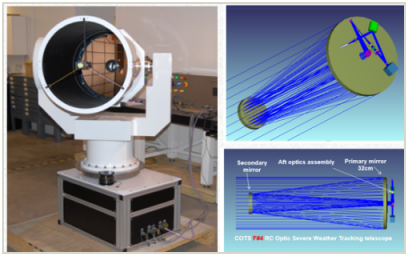
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140313)*

Images



Briefing Chart Image
High Speed Lasercom Signal Processing and Ground Station, Phase I
(https://techport.nasa.gov/image/130993)



Final Summary Chart Image
High Speed Lasercom Signal Processing and Ground Station, Phase I Project Image
(https://techport.nasa.gov/image/134145)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Fibertek, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

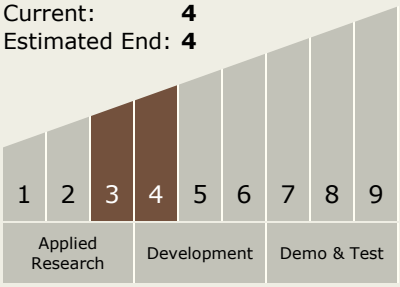
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Michael Albert

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



High Speed Lasercom Signal Processing and Ground Station, Phase I

Completed Technology Project (2016 - 2016)

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
    - TX05.1.6 Optimetrics

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System